

Applicants: Lincoln *et al.*  
Serial No.: 09/618,178  
Filed: July 18, 2000  
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48. (New) A method of determining both genotype and confidence scores at a genetic locus for a plurality of samples of genetic material obtained from a subject and wherein the plurality of samples have been prepared under comparable conditions, comprising:

- B1
- (a) assembling input signals from each sample in a Euclidean representation;
  - (b) determining the initial conditional probability for each input signal in the Euclidean representation for each genotype;
  - (c) computing a conditional probability of each genotype for each input signal, and
  - (d) determining the genotype and confidence score for each input signal, thus determining the genotype and confidence score at the genetic locus for each sample.

49. (New) A method according to claim 48, wherein the input signals are reaction values.

50. (New) A method according to claim 48, wherein the Euclidean representation is a two dimensional plot of a first reaction value on the x axis and a second reaction value on the y axis.

D 51. (New) A method according to claim <sup>72</sup>~~49~~, wherein the reaction values are measurements of an optical signal or a digital image intensity value.

D 52. (New) A method according to claim <sup>74</sup>~~50~~, wherein the reaction values are measurements of an optical signal or a digital image intensity value.

53. (New) A method according to claim 51, wherein the optical signal is an optical density.

54. (New) A method according to claim 52, wherein the optical signal is an optical density.

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55. (New) A method according to claim 48, wherein the input signals are a combination of two reaction values.

56. (New) A method according to claim <sup>72</sup>~~49~~, wherein the reaction values are obtained by assaying for alleles using a method selected from the group consisting of genetic bit analysis, hybridization, allele-specific amplification and a ligase chain reaction.

57. (New) A method according to claim 56, wherein the reaction values are obtained by assaying for alleles using genetic bit analysis.

58. (New) A method according to claim <sup>74</sup>~~50~~, wherein the reaction values are obtained by assaying for alleles using a method selected from the group consisting of genetic bit analysis, hybridization, allele-specific amplification and a ligase chain reaction.

59. (New) A method according to claim 58, wherein the reaction values are obtained by assaying for alleles using genetic bit analysis.

60. (New) A method according to claim <sup>72</sup>~~48~~, further comprising detecting the presence of a downward trend in confidence scores over time.

61. (New) A method according to claim <sup>72</sup>~~60~~, further comprising triggering an alarm condition upon detecting a statistically significant downward trend in confidence scores over time.

62. (New) A method according to claim <sup>7a</sup>~~49~~, wherein the reaction values are obtained by assaying for one or more alleles that provide information relating to a trait.

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D 63. (New) A method according to claim <sup>74</sup>~~50~~, wherein the reaction values are obtained by assaying for one or more alleles that provide information relating to a trait.

D 64. (New) A method according to claim <sup>72</sup>~~49~~, wherein one or more of the reaction values are obtained by assaying for one or more alleles that provide information pertaining to parentage of the subject.

B1 cont 65. (New) A method according to claim <sup>74</sup>~~50~~, wherein one or more of the reaction values are obtained by assaying for one or more alleles that provide information pertaining to parentage of the subject.

66. (New) A method according to claim <sup>72</sup>~~48~~, wherein more than one genetic loci are analyzed.

P 67. (New) A method according to claim <sup>72</sup>~~49~~, wherein the reaction values are obtained by assaying for one or more alleles that provide information useful for determining the identity of the subject.

D 68. (New) A method according to claim <sup>74</sup>~~50~~, wherein the reaction values are obtained by assaying for one or more alleles that provide information useful for determining the identity of the subject.

69. (New) A method of determining for a plurality of samples analyzed with comparable biochemistry a genotype and confidence score for the genotype at a locus within genetic material, comprising:

(a) measuring, under comparable conditions, a first reaction value for each sample, indicative of the presence of a given allele at the locus;

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- (b) forming a data set from the reaction values;  
(c) establishing initial probability distributions for the genotype of interest at the locus;  
(d) calculating the conditional probability of each genotype of interest at the locus by applying the first reaction value to each probability distribution in the set of probability distributions that corresponds to the first reaction value; and  
(e) determining the genotype and confidence score.

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70. (New) A method according to claim 69, further comprising:  
measuring, under comparable biochemistry, a second reaction value corresponding to the presence of a second allele at the locus;  
forming a data set of reaction values corresponding to the second allele;  
applying the first and second reaction values to each pertinent probability distribution to determine a measure of the conditional probability of each genotype of interest at the locus, and  
determining the confidence score and genotype for each sample.

71. (New) A method according to claims 69 or 70, wherein the comparable conditions comprise all of the samples being prepared using the same reagent batch.

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### REMARKS

The claims have been replaced by new claims as set forth above to describe a preferred embodiment of the invention.